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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,122	08/25/2003	T. Warren Weeks	N0400,70017US00	5512

7590 03/24/2005

Robert H. Walat
Wolf, Greenfield & Sacks, P.C.
600 Atlantic Avenue
Boston, MA 02210

EXAMINER

LEE, EUGENE

ART UNIT PAPER NUMBER

2815

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/650,122

Applicant(s)

WEEKS ET AL.

Examiner

Eugene Lee

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/26/05.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-42, 44, 45, 47-49 and 106-116 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-42, 44, 45, 47-49 and 106-116 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/26/05, 12/22/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because in Fig. 16, it is not clear whether the element 120 is referring to the third layer from the bottom or the second layer from the bottom. It appears the element 120 is being directed towards the second layer even though the label "120" is in the third layer. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 109 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 109 recites the limitation "electrical contact" in line 1 of said. There is insufficient antecedent basis for this limitation in the claim. It is not clear whether the applicant is referring to the first or second electrical contact. Also, the limitation "electrical contact ... is formed between a portion of the electrical contact and a sidewall of the via" is unclear since an electrical contact can not be between itself.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 40, 42, 44, 47 thru 49, 108, 111, 113, and 116 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porret 4,038,580 in view of Inoue et al. 11-317546 JPO. Porret discloses (see, for example, FIG. 2) a diode (semiconductor device) comprising a substrate 1, transparent zone (material region) 3, upper electrode (first electrical contact) E₁, upper electrode (second electrical contact) E₁, recess (at least one via) 100, and common electrode (electrically conductive material) E₂. Light spans (electrically connected) the entire transparent zone by reflecting off the common electrode and traveling towards the upper electrode. Porret does not disclose the material region being gallium nitride. However, Inoue discloses (see, for example,

Art Unit: 2815

abstract) a light-emitting device comprising a transparent material such as GaN (gallium nitride). It would have been obvious to one of ordinary skill in the art to have the material region being gallium nitride since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (In re Leshin, 125 USPQ 416) in order to have emission brightness.

Regarding claim 42, see, for example, FIG. 2 wherein Porret discloses the upper electrodes E1, E2 which are clearly over the same plane of the material region 3.

Regarding claims 44, and 113, see, for example, FIG. 2 wherein Porret discloses a first transition layer (transition layer) 2.

Regarding claim 111, Porret in view of Inoue does not disclose the electrically conductive material comprising titanium and gold. However, such a material provides adequate electrical conductivity and reflectivity for a charge and the light dispersed in a semiconductor device. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to have the electrically conductive material comprising titanium and gold since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice (In re Leshin, 125 USPQ 416) in order to have adequate electrical conductivity and reflectivity in the semiconductor device.

6. Claim 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porret 4,038,580 in view of Inoue et al. 11-317546 JPO as applied to claims 40, 42, 44, 47-49, 108, 111, 113, and 116 above, and further in view of Hashimoto et al. 6,069,394. Porret in view of

Inoue does not disclose the first portion and the second portion being on different planes.

However, Hashimoto discloses (see, for example, Fig. 6) a light emitting diode comprising contacts 17, 16 on different planes. In column 8, lines 30-36, Hashimoto discloses the semiconductor device being light emitting diode, or a field effect transistor. It would have been obvious to one of ordinary skill in the art at the time of invention to have the first portion and the second portion being on different planes in order to form another form of a light emitting diode wherein voltages may be applied to the top surface of a transistor.

7. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over Porret 4,038,580 in view of Inoue et al. 11-317546 JPO as applied to claims 40, 42, 44, 47-49, 108, 111, 113, and 116 above, and further in view of McNeely et al. 4,582,952, and further in view of Anytpas 3,696,262. Porret in view of Inoue does not disclose the transition layer being compositionally-graded. However, McNeely discloses (see, for example, Fig. 1) a semiconductor device comprising a compositionally graded transition region 10. In column 3, lines 58-61, McNeely discloses the compositionally graded transition region as minimizing dislocations between a substrate and an active layer. It would have been obvious to one of ordinary skill in the art at the time of invention to have a transition layer in order to minimize dislocations between a substrate and an active layer. Porret in view of Inoue in view of McNeely does not disclose a transition layer further comprising a constant composition transition layer. However, Anytpas discloses (see, for example, FIG. 3) a semiconductor device comprising two transition layers 42a, 42b. In column 5, lines 33-35, Anytpas discloses that additional transition layers further relieves lattice mismatch to facilitate crystal growth. Therefore, it would have been obvious to one of ordinary

Art Unit: 2815

skill in the art at the time of invention to have a transition layer further comprising a constant composition layer in order to further relieve lattice mismatch to facilitate crystal growth.

9. Claims 106, 107, 112, and 115 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porret 4,038,580 in view of Inoue et al. 11-317546 JPO as applied to claims 40, 42, 44, 47-49, 108, 111, 113, and 116 above, and further in view of Buck et al. 5,252,842. Porret in view of Inoue does not disclose a third electrical contact. However, Buck discloses (see, for example, FIG. 2) a semiconductor device comprising a gate region (third electrical contact) 208, source region 204, and drain region 206. Such a structure forms a field effect transistor. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have third electrical contact in order to form another type of light emitting device such as a field effect transistor.

10. Claims 109, and 110 are rejected under 35 U.S.C. 103(a) as being unpatentable over Porret '580 in view of Inoue et al. 11-317546 JPO as applied to claims 40, 42, 44, 47-49, 108, 111, 113, and 116 above, and further in view of Furukawa et al. 6,465,809 B1. Porret in view of Inoue in view of Furukawa does not disclose the electrical contact comprising a first material and a layer of second material. However, Furukawa discloses (FIG. 17C, and column 29, lines 41-42) a light emitting element comprising an electrode 19A wherein the electrode comprises gold/Ge alloy (first material) and gold (second material). It would have been obvious to one of ordinary skill in the art at the time of invention to have the electrical contact comprising a first

Art Unit: 2815

material and a layer of second material in order to have a contact of adequate electrical conductivity.

11. Claim 114 is rejected under 35 U.S.C. 103(a) as being unpatentable over Porret 4,038,580 in view of Inoue et al. 11-317546 JPO as applied to claims 40, 42, 44, 47-49, 108, 111, 113, and 116 above, and further in view of Morita 6,232,623 B1. Porret in view of Inoue does not disclose the gallium nitride material region including an AlGa_N layer. However, Morita discloses (see, for example, Fig. 1) an AlGa_N layer 10 on top of a Ga_N layer 9. The AlGa_N layer serves as a cladding layer that sandwiches the Ga_N layer. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have the gallium nitride material including an AlGa_N layer in order to clad the Ga_N layer and more effectively produce carriers from the Ga_N layer.

INFORMATION ON HOW TO CONTACT THE USPTO

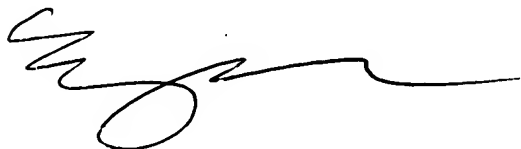
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 571-272-1733. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 571-272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eugene Lee
March 18, 2005

A handwritten signature in black ink, appearing to be 'Eugene Lee', with a long horizontal line extending to the right.